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Kay Y. Blohowiak

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04/23/2007

LEE & HAYES, PLLC  
421 W. RIVERSIDE AVE.  
SUITE 500  
SPOKANE, WA 99201

EXAMINER

SELLMAN, CACHET I

ART UNIT

PAPER NUMBER

1762

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/751,303	<b>Applicant(s)</b> BLOHOWIAK ET AL.	
	<b>Examiner</b> Cachet I. Sellman	<b>Art Unit</b> 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 4-13, 16-21, 23-34, 37-40, 42-45 and 47-70 is/are pending in the application.
- 4a) Of the above claim(s) 47-60 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-13, 16-21, 23-34, 37-40, 42-45 and 61-70 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Acknowledgement is made of the amendment filed by the applicant on 1/29/2007, in which claims 1-3, 14-15,22, 35-36,41 and 46 were cancelled, claims 16 and 24 were amended and claims 63-70 were added. Claims 4-13, 16-21, 23-34, 37-40, 42-45, and 61-70 are currently pending in U.S. Application Serial No. 10/751,303.

### ***Claim Rejections - 35 USC § 112***

The 35 USC 112 2<sup>nd</sup> paragraph rejection of claims 14 and 35 in paragraph 8 of the previous office action dated 12/01/2006 is withdrawn due to cancellation of the claims by applicant in the amendment filed 1/29/2007.

### ***Response to Arguments***

1. Applicant's arguments, see pages 16-17, filed 1/29/2007, with respect to claims 4, 16, 43, and 45 have been fully considered and are persuasive. The rejections of claims 4, 16,43 and 45 have been withdrawn. The applicant argues that Shimizu (US 43748902) does not teach the use of a novolac epoxy in the adhesive. The applicant states that Shimizu uses a product of bisphenol A and epichlorohydrin which is bisphenol A diglycidyl, and that novolac-epoxy is formed from phenol and formaldehyde therefore there is no teaching of using novolac-epoxy. The examiner agrees through further research that the product of bisphenol A and epichlorohydrin is not the same as novolac epoxy. The examiner would also like to note that the novolac is formed by phenol formaldehyde and epichlorohydrin and not just from phenol and formaldehyde as noted by the applicant (page 16).

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 4-13 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. (US 5869141) in view of Shimizu et al. (US 4374890) and Dow Product Information (DEN 425 Epoxy Novolac Resin).

Blohowiak et al. teaches a process for applying a sol-gel coating to a metal material and an adhesive coating onto the sol-gel coating (abstract, Fig. 1). Blohowiak et al. teaches pretreating the metal surface with Turco 5578 alkaline etch (caustic solution of NaOH) and rinsing the metal material with deionized water (Table 6, column 2, lines 44-47); applying a sol-gel coating to the metal material (column 19, lines 32-33); evaporating the water portion of the sol-gel coating (column 19, lines 35-39); applying a liquid adhesive coating to the sol-gel coating on the metal where the adhesive is an epoxy adhesive.

Blohowiak et al. does not teach that the adhesive is an epoxy material comprising about 3-35% by wt. diglycidylether of bisphenol-A, about 35-60% by wt. diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy terminated acrylonitrile-butadiene rubber; and a second curative material

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comprising about 0-100% by wt. 4,4' -diaminodiphenylsulfone, about 0-100% by wt. 3,3'diaminodiphenylsulf-one, and about 0-0.2% by wt. chromium octotatate as required by **claims 4 and 16.**

Shimizu et al. teaches applying an adhesive to a metal plate where the adhesive comprises a first epoxy composition and a second epoxy composition then the composition is cured by heating the modulus of elasticity in tension sufficient to increase the stiffness of the metal (abstract). Shimizu et al. teaches that the epoxy resins can be glycidyl ether type and can be used alone or in combination with each other depending on the desired physical properties of the epoxy resin composition. The resin includes hardeners that are used to exhibit curing action upon heating such as 4,4'-diaminodiphenylsulfone in amounts between 1-15% by weight of the total epoxy resin (column 3, lines 32-50). Shimizu et al. teaches that various additives can be used such as high molecular weight epoxy resins derived from bisphenol A and butadiene acrylonitrile copolymers in the amount of 5-100 % by weight which increases the formability of the adhesive (column 3, lines 57-64). Shimizu et al. teaches the use of 35 parts of bisphenol A type liquid epoxy resin with 50 parts bisphenol a type solid epoxy resin (column 5, lines 63-66). Shimizu et al. also teaches the use of 10 % of carboxyl group containing nitrile rubber (column 6, lines 37-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the epoxy material of Shimizu et al. using the amounts of the claim through routine experimentation especially absent any criticality in using the claimed range. One would

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have been motivated to do so because Shimizu et al. teaches that the amount and components of the mixture affects the overall cohesive force, sag, viscosity, and wetting properties of the resin (column 3, lines 51-56) therefore one would have a reasonable expectation of success in applying the adhesive to the metal substrate.

Dow Product Information states that novolac resin has higher functionality than standard bisphenol A based epoxy resins and have good thermal stability, mechanical strength and resistance against chemicals. The novolac resin produces a more tightly cross-linked cured system than bisphenol-A based liquid epoxy resins.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the adhesive of Shimizu et al. and use the novolac resin in Dow Product Information. One would have been motivated to do so because both discloses resins that can be used in adhesives and Dow Product Information further teaches the advantages of improved temperature performance, mechanical strength and resistance to various chemicals when using novolac over epoxies formed from bisphenol A.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. to include applying the epoxy mixture of Shimizu et al. and Dow Product Information. One would have been motivated to do so because both disclose applying epoxy adhesive to a metal substrate and Shimizu et al. further teaches that the adhesive does not have the problem of forming strain or depression in the metal therefore one would have a reasonable expectation of success in applying the epoxy resin.

Blohowiak et al. teaches that the sol gel can be applied to titanium, aluminum, copper, or iron metals or alloys (column 19, lines 52-55) as required by **claims 5 and 17**. The concentration of sodium hydroxide in Turco 5578-L is 10-30% as required by **claim 6**. The temperature of the caustic solution is 190 (+/- 5) ° F (Table 6, column 20, line 45) as required by **claims 8 and 9**. The sol-gel coating is 20-500 nm thick (column 4, lines 42-45) as required by **claim 10**.

Blohowiak et al. does not teach that the NaOH concentration in the caustic solution is 25% as required by **claim 7** or that the sol-gel layer is about 100 nm thick as required by **claim 11**. However, Blohowiak et al. teaches that the alkaline etch with TURCO 5578 (caustic solution with NaOH) produces a roughened surface better suited for adhesive bonding. The concentration of the alkaline solution will affect the roughening of the surface making it a result effective variable. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process to include the concentration within the claimed range through routine experimentation in order to achieve the desired roughening of the metal surface especially absent any criticality in using the claimed range.

Blohowiak et al. also teaches that if the sol-gel coating becomes too thick the film becomes glassy (column 4, lines 49-55). Therefore the thickness is a result effective variable. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the thickness within the claimed range through routine

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experimentation in order to achieve the desired appearance of the film especially absent any criticality in using the claimed range.

Blohowiak et al. further teaches that the sol gel is a mixture of a zirconium alkoxide, 3-glycidoxy-propyltrimethoxysilane, and glacial acetic acid (column 3, lines 3-10). Blohowiak et al also teaches that the sol gel mixture can be an organozirconium compound such as tetra n-propoxyzirconium, an organosilane such as 3-glycidoxypropyltrimethoxysilane and an acetic acid catalyst (column 4, lines 28-35).

Blohowiak et al. does not teach that the mixture has to have a surfactant as required by **claims 12 and 13**.

However, Blohowiak et al. states that the mixture can have surfactants or thixotropic agents in the solution to improve spray characteristics. The surfactants or thixotropic agents help to provide a more uniform sprayed coating and improve the manufacturability of the process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a surfactant in the mixtures. One would have been motivated to do so because Blohowiak et al. teaches using surfactants improves the spray characteristics of the solution; provides a more uniform spray coating; and



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improves the manufacturability of the process therefore one would have a reasonable expectation of success of applying the sol gel.

4. Claims 18-19 and 61-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. in view of Shimizu et al. and Dow Product Information as applied to claims 4 and 16 above and further in view of Montano et al. (US 6616976 B2).

The teachings of Blohowiak et al. in view of Shimizu et al. and Dow Product Information as applied to claims 4 and 16 are as stated above.

Blohowiak et al. in view of Shimizu et al. and Dow Product Information does not teach applying the adhesive coating in a dip-coating tank or by spraying as required by **claims 18 and 19.**

Montano et al. teaches a method for treating adhesion promoted metal surfaces with an epoxy resin. Montano et al. discloses a process of roughening a metal surface, applying an adhesion promotion composition to the metal surface then coating it with an epoxy resin composition (abstract). Montano et al. also teaches that the epoxy resin composition is can be applied by spray coating, dip coating, roller coating, or any suitable method to apply an epoxy resin (column 9, lines 41-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. to include applying the

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epoxy adhesive using the methods of Montano et al. One would have been motivated to do so because both disclose processes where a metal is coated with an adhesion promotion composition and then coated with an epoxy resin and Montano et al. further discloses an operable way of applying the epoxy resin coating therefore one would have a reasonable expectation of success in applying the adhesive coating to the metal.

5. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. in view of Shimizu et al. and Dow Product Information as applied to claim 16 above, and further in view of Tola (US 5049232).

The teachings of Blohowiak et al. in view of Shimizu et al. Dow Product Information as applied to claim 16 are as stated above.

Blohowiak et al. in view of Shimizu Dow Product Information does not each applying the adhesive to a thickness of 0.1 – 3.0 mils or 0.75 as required by **claims 20 and 21**.

Tola discloses a method for forming a foil/dielectric laminate by applying an epoxy resin to the foil, baking the adhesive in an oven to remove the solvent in the adhesive, which dries the adhesive and reduces the thickness of the layer to about 0.4 mils. The thickness is a result effective variable, which depends on the curing conditions. It would have been obvious to one having ordinary skill in the art at the time

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the invention was made to use the thickness within the claimed range through routine experimentation in order to ensure that the foil is laminated to the dielectric especially since there is no evidence in using the thickness in the claimed range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. to include applying the adhesive at the thickness as taught by Tola. One would have been motivated to do so because both disclose applying an epoxy to a foil for form a laminate and Tola teaches a process where a laminate is formed using an epoxy applied to a foil therefore one would have a reasonable expectation of success in forming the laminate.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. in view of Shimizu et al. and Dow Product Information as applied to claim 16 above and further in view of Poutasse et al. (US 5629098).

The teachings Blohowiak et al. in view of Shimizu et al and Dow Product Information as applied to claim 16 are as stated above.

Blohowiak et al. in view of Shimizu et al. does not teach that the solvent is acetone as required by **claim 23**.

Poutasse et al. discloses applying an epoxy adhesive to foil to produce a laminate. Poutasse et al. teaches that the adhesive contains a solvent where the solvent can be acetone (column 4, lines 55-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. in view of Shimizu et al. to include the solvent of Poutasse et al. One would have been motivated to do because both disclose processes for applying an epoxy adhesive that contains an epoxy novolac, bisphenol epoxy resin to a foil to make a laminate where the foil is roughened before the adhesive is applied and Poutasse further teaches that the adhesive contains a solvent therefore one would have a reasonable expectation of success in forming the epoxy adhesive.

7. Claims 24-34 and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. (US 5869141) in view of Vaughn (US 3967091), Grylls (US 2002/0192496 A1), Shimizu (US 4374890), Dow Product Information and Konieczny (US 4374890).

Blohowiak et al. teaches a process of grit blasting a metal material with fine particles of aluminum oxide where the mesh size is about 180 (column 10, lines 42-58); subjecting the metal material to a caustic solution of sodium hydroxide that has a concentration of about 10-30% by weight of sodium hydroxide (column 20, lines 44-55); rinsing the metal material with water to remove the caustic solution of sodium hydroxide

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(column 20, line 47); applying a sol-gel coating to the metal material where the sol-gel coating is a mixture of zirconium alkoxide, 3-glycidoxy-propyltrimethoxysilane, and glacial acetic acid (column 3, lines 3-10); evaporating the water portion of the sol-gel coating (column 3, lines 18-21); applying a liquid adhesive coating to the metal material and evaporating the solvent of the adhesive coating (abstract, Fig. 1).

Blohowiak et al. does not teach grit blasting with a mixture of aluminum oxide in air and water then rinsing the metal to remove the grit or using a mesh size of 280 or using an epoxy material comprising about 3-35% by wt. diglycidylether of bisphenol-A, about 35-60% by wt. diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy terminated acrylonitrile-butadiene rubber; and a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulf-one, and about 0-0.2% by wt. chromium octotatate as required by **claims 24, 26, 43 and 45**.

Vaughan et al. discloses a process for cleaning titanium alloy to remove oxide coating. The process includes cleaning the alloy (column 2, lines 17-19) using grit blasting with 50 micron alumina, water rinsing, immersing in a solvent and water rinsing (column 4, lines 34-38).

Grylls et al. teaches a method for coating a turbine airfoil where the airfoil is grit blasted to improve the surface finish. The airfoil can be grit blasted using particles

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mixed with compressed air and water vapor [0020] where the particles are alumina [0022]. Grylls et al. teaches that pressures and sizes must be controlled to prevent chipping of the surface. The grit size can be smaller than 60 mesh and preferably smaller than 220 mesh [0022].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. to include the grit removal process of Vaughan et al. and grit blasting using water, air and alumina as taught by Grylls et al. One would have been motivated to do so because all teach processes of cleaning a metal substrate using grit blasting, Vaughan et al. teaches that the grit can be removed by water rinsing as is later immersed in solvent which is a step in the process of Blohowiak et al. and Grylls et al. teaches that by blasting with water vapor, air, and alumina improves the surface finish of the metal as well as prevents chipping of the surface therefore one would have a reasonable expectation of success in cleaning the metal substrate.

Konieczny discloses that grit blasting is used in a variety of manufacturing processes. Aluminum oxide particles of a selected size are directed against a surface to be blasted by compressed air or water. The goal is to create a surface having a roughness within a certain range, which is achieved by varying the size of the alumina grit, and the air pressure (column 1, lines 16-24).

It would have been obvious to one having ordinary skill in the art to modify the process of Blohowiak et al. in view of Grylls et al. and Vaughan et al. to include the mesh size of about 280. One would have been motivated to do so because Konieczny teaches that the mesh size is a result effective variable because it controls the surface roughness. Therefore it would have been obvious to one having ordinary skill in the art at the time to use the mesh size within the claimed range through routine experimentation in order to obtain a desired surface finish especially absent any criticality in using the claimed range.

Shimizu et al. teaches applying an adhesive to a metal plate where the adhesive comprises a first epoxy composition and a second epoxy composition then the composition is cured by heating the modulus of elasticity in tension sufficient to increase the stiffness of the metal (abstract). Shimizu et al. teaches that the epoxy resins can be glycidyl ether type and can be used alone or in combination with each other depending on the desired physical properties of the epoxy resin composition. The resin includes hardeners that are used to exhibit curing action upon heating such as 4,4'-diaminodiphenylsulfone in amounts between 1-15% by weight of the total epoxy resin (column 3, lines 32-50). Shimizu et al. teaches that various additives can be used such as high molecular weight epoxy resins derived from bisphenol A and butadiene acrylonitrile copolymers in the amount of 5-100 % by weight which increases the formability of the adhesive (column 3, lines 57-64). Shimizu et al. teaches the use of 35 parts of bisphenol A type liquid epoxy resin with 50 parts bisphenol a type solid epoxy

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resin (column 5, lines 63-66). Shimizu et al. also teaches the use of 10 % of carboxyl group containing nitrile rubber (column 6, lines 37-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the epoxy material of Shimizu et al. using the amounts of the claim through routine experimentation especially absent any criticality in using the claimed range. One would have been motivated to do so because Shimizu et al. teaches that the amount and components of the mixture affects the overall cohesive force, sag, viscosity, and wetting properties of the resin (column 3, lines 51-56) therefore one would have a reasonable expectation of success in applying the adhesive to the metal substrate.

Dow Product Information states that novolac resin has higher functionality than standard bisphenol A based epoxy resins and have good thermal stability, mechanical strength and resistance against chemicals. The novolac resin produces a more tightly cross-linked cured system than bisphenol-A based liquid epoxy resins.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the adhesive of Shimizu et al. and use the novolac resin in Dow Product Information. One would have been motivated to do so because both discloses resins that can be used in adhesives and Dow Product Information further teaches the advantages of improved temperature performance, mechanical strength and resistance to various chemicals when using novolac over epoxies formed from bisphenol A.



It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. to include applying the epoxy mixture of Shimizu et al. and Dow Product Information. One would have been motivated to do so because both disclose applying epoxy adhesive to a metal substrate and Shimizu et al. further teaches that the adhesive does not have the problem of forming strain or depression in the metal therefore one would have a reasonable expectation of success in applying the epoxy resin.

The metal can be titanium, aluminum, stainless steel, nickel or copper as required by **claims 25 and 44**.

Blohowiak et al. teaches that the caustic solution of sodium hydroxide has a concentration of about 10-30% by weight sodium hydroxide as required by **claim 27**.

Blohowiak et al. does not teach that the NaOH concentration in the caustic solution is 25% as required by **claim 28**. However, Blohowiak et al. teaches that the alkaline etch with TURCO 5578 (caustic solution with NaOH) produces a roughened surface better suited for adhesive bonding. The concentration of the alkaline solution will affect the roughening of the surface making it a result effective variable. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process to include the concentration within the claimed range.

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through routine experimentation in order to achieve the desired roughening of the metal surface especially absent any criticality in using the claimed range.

The temperature of the caustic solution is 190°F as required by **claims 29 and 30**. Blohowiak et al. teaches that the sol-gel layer is about 10 – 500 nm thick as required by **claim 31**.

Blohowiak et al. does not teach that the sol-gel layer is 100 nm as required by **claim 32**.

However, Blohowiak et al. also teaches that if the sol-gel coating becomes too thick the film becomes glassy (column 4, lines 49-55). Therefore the thickness is a result effective variable. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the thickness within the claimed range through routine experimentation in order to achieve the desired appearance of the film especially absent any criticality in using the claimed range.

Blohowiak et al. teaches that the sol-gel is a mixture of a zirconium alkoxide, 3-glycidoxy-propyltrimethoxysilane, and glacial acetic acid (column 3, lines 3-10).

Blohowiak et al. also teaches that the sol-gel is a mixture of zirconium n-propoxide, 3-glycidoxy-propyltrimethoxysilane, and glacial acetic acid (column 4, lines 28-35).

Blohowiak et al. does not teach that the mixture must have a surfactant as required by

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**claims 33 and 34.** However, Blohowiak et al. does state that the mixture can have surfactants or thixotropic agents in the solution to improve spray characteristics. The surfactants or thixotropic agents help to provide a more uniform sprayed coating and improve the manufacturability of the process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a surfactant in the mixtures. One would have been motivated to do so because Blohowiak et al. teaches using surfactants improves the spray characteristics of the solution; provides a more uniform spray coating; and improves the manufacturability of the process therefore one would have a reasonable expectation of success of applying the sol gel.

8. Claims 37, 38, 63-64 and 67-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. in view of Grylls et al., Vaughan et al., Konieczny, Shimizu et al. and Dow Product Information as applied to claims 24, 43 and 45 above and further in view of Montano et al. (US 6616976 B2).

The teachings of Blohowiak et al. in view of Grylls et al., Vaughan et al., Konieczny, Shimizu et al. and Dow Product Information as applied to claim 24, 43 and 45 are as stated above.

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Blohowiak et al. in view of Grylls et al., Vaughan et al., and Konieczny does not teach applying the adhesive coating in a dip-coating tank or by spraying as required by **claims 37- 38, 63-64 and 67-68.**

Montano et al. teaches a method for treating adhesion promoted metal surfaces with an epoxy resin. Montano et al. discloses a process of roughening a metal surface, applying an adhesion promotion composition to the metal surface then coating it with an epoxy resin composition (abstract). Montano et al. also teaches that the epoxy resin composition is can be applied by spray coating, dip coating, roller coating, or any suitable method to apply an epoxy resin (column 9, lines 41-46).

9. Claims 39-40, 66 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. in view of Grylls et al., Vaughan et al. Konieczny, Shimizu et al. and Dow Product Information as applied to claims 24, 43 and 45 above in further view of Tola (US 5049232).

The teachings of Blohowiak et al. in view of Grylls et al., Vaughan et al. Konieczny, Shimizu et al. and Dow Product Information as applied to claim 24 are as stated above.

Blohowiak et al. in view of Grylls et al. and Vaughan et al. does not each applying the adhesive to a thickness of 0.1 – 3.0 mils or 0.75 as required by **claims 39-40, 66 and 70.**

Tola discloses a method for forming a foil/dielectric laminate by applying an epoxy resin to the foil, baking the adhesive in an oven to remove the solvent in the adhesive, which dries the adhesive and reduces the thickness of the layer to about 0.4 mils. The thickness is a result effective variable, which depends on the curing conditions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the thickness within the claimed range through routine experimentation in order to ensure that the foil is laminated to the dielectric especially since there is no evidence in using the thickness in the claimed range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. to include applying the adhesive at the thickness as taught by Tola. One would have been motivated to do so because both disclose applying an epoxy to a foil for form a laminate and Tola teaches a process where a laminate is formed using an epoxy applied to a foil therefore one would have a reasonable expectation of success in forming the laminate.

10. Claims 42, 65 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blohowiak et al. in view of Grylls et al., Vaughan et al. Konieczny, Shimizu et al. and Dow Product Information and Tola as applied to claims 40, 43 and 45 in further view of Poutasse et al. (US 5629098).

Blohowiak et al. in view of Grylls et al., Vaughan et al. Konieczny, Shimizu et al. and Dow Product Information and Tola as applied to claims 40, 43 and 45 are as stated above.

Blohowiak et al. in view of Grylls et al., Vaughan et al. Konieczny, Shimizu et al. and Dow Product Information and Tola does not teach that the solvent is acetone as required by **claims 42, 65 and 69**.

Poutasse et al. discloses applying an epoxy adhesive to foil to produce a laminate. Poutasse et al. teaches that the adhesive contains a solvent where the solvent can be acetone (column 4, lines 55-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Blohowiak et al. in view of Grylls et al., Vaughan et al. Konieczny, Shimizu et al. and Dow Product Information and Tola to include the solvent of Poutasse et al. One would have been motivated to do because both disclose processes for applying an epoxy adhesive that contains an epoxy novolac, bisphenol epoxy resin to a foil to make a laminate where the foil is roughened before the adhesive is applied and Poutasse further teaches that the adhesive contains a solvent therefore one would have a reasonable expectation of success in forming the epoxy adhesive.

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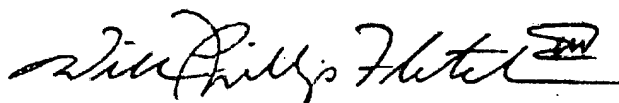
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cachet I. Sellman whose telephone number is 571-272-0691. The examiner can normally be reached on Monday through Friday, 7:00 - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Cachet I Sellman  
Examiner  
Art Unit 1762

Cis



William Phillip Fletcher III  
Primary Examiner  
Art Unit 1762